10/25/17

"One finds limits by pushing them."-Herbert Simon

HW: "Multiplying and Dividing Rational Expressions" worksheet #2-16 even
Test 3 on Monday 10/30

AIM: How do we Multiply or Divide Rational Expressions?

Warm Up:

1) Simplify $\frac{x-1}{1-x} = -1$

HW ✓

8) $\frac{15mx}{5m^2x} = \frac{3}{m}$

9) $\frac{(n+4)(n+4)}{n^2+8n+16} = \frac{n+4}{4-n}$

$16-n^2 = (4+n)(4-n)$

10) $\frac{20-4x}{x^2-2x-15} = \frac{4(5-x)}{(x+3)(x-5)} = \frac{-4}{x+3}$

(-1)

11) $\frac{5y^2+10xy}{5y} = \frac{5y(y+2x)}{5y} = y+2x$

16) $\frac{x(x+2) \mid +y(x+2)}{x^2+2x \mid +xy+2y} = \frac{(x+2)(x+y)}{(x+2)(x+2)} = \frac{x+y}{x+2}$

$\frac{x^2+4x+4}{(x+2)(x+2)}$

Simply Put:

The rule for multiplying algebraic fractions
is the same as the rule for multiplying numerical fractions.

Multiply the tops *(numerators)*
AND
multiply the bottoms *(denominators)*.

If possible, reduce (cancel) ***BEFORE*** you multiply the tops and bottoms!
(It's easier than simplifying at the end!)

Remember to factor first if possible.

Factor everything that can be factored.

1) $\frac{2a^2}{5b} \cdot \frac{15b^3}{4a^2} = \frac{2a^2 \cdot 15b^3}{5b \cdot 4a^2} = \frac{3b^2}{2}$

(*) When multiplying
cancel any numerator factor
with any denominator factor

3) $\frac{x^2-x}{3x} \cdot \frac{x^2-x-2}{x^2-1} = \frac{x-2}{3}$

$\frac{x(x-1)}{3x} \cdot \frac{(x-2)(x+1)}{(x+1)(x-1)}$

5) $\frac{2x+8}{3} \cdot \frac{6x^2}{4x+16} = \frac{x^2}{1} = x^2$

$\frac{2(x+4)}{3} \cdot \frac{2 \cdot 3x^2}{4(x+4)2}$

Simply Put:

The rule for dividing algebraic fractions
is the same as the rule for dividing numerical fractions.

Change the division sign to multiplication,
flip the 2nd fraction ONLY,
and then follow the steps for "multiplying rational expressions".

7) $\frac{x^2-5x+4}{3x} \div \frac{x^2-16}{12x}$

$\frac{(x-4)(x-1)}{x^2-5x+4} \cdot \frac{12x}{x^2-16} = \frac{4(x-1)}{x+4}$ OR $\frac{4x-4}{x+4}$

$\frac{3x}{(x-4)(x+4)}$

9) $\frac{c^2-2c-24}{c^2+4c} \div \frac{c^2-36}{6+c}$

$\frac{(c-6)(c+4)}{c^2-2c-24} \cdot \frac{6+c}{c^2-36} = \frac{6+c}{c(c+6)} = \frac{1}{c}$

$\frac{c(c+4)}{(c-6)(c+6)}$

HW ✓

2) $\frac{3x}{8y} \cdot \frac{12y^2}{9} = \frac{xy}{2}$

4) $\frac{2(2-x)}{4-2x} \cdot \frac{x+2}{x^2-4} = \frac{2-x}{x-2} = -1$

$(x+2)(x-2)$

10) $\frac{(w+8)(w-3)}{w^2+5w-24} \cdot \frac{(w+10)(w-4)}{w^2+6w-40} = \frac{(w+8)(w+10)}{(w+4)(w+7)}$

$\frac{w^2-16}{(w+4)(w-4)} \quad \frac{w^2+4w-21}{(w+7)(w-3)}$

$= \frac{w^2+18w+80}{w^2+11w+28}$